Name _____   Student Number _____

All solutions are to be presented on the paper in the space provided. The quiz is closed book, no calculators.

   (1) Evaluate the following:

      (a) $\cos \frac{\pi}{4} = \frac{1}{\sqrt{2}}$

      (b) $\tan \frac{\pi}{3} = \sqrt{3}$

      (c) $\csc \frac{\pi}{6} = 2$

      (d) $\sin \pi = 0$

      (e) $\cos \pi = -1$

      (f) $\tan \frac{11\pi}{4} = -1$
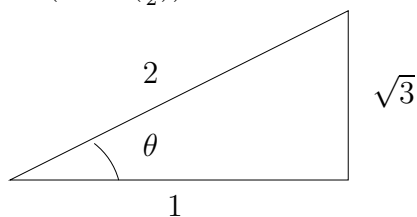
      (g) $\sec \left(-\frac{3\pi}{2}\right) = 0$

(h) $\sin^{-1}\frac{1}{\sqrt{2}} = \frac{\pi}{4}$

(i) $f^{-1}(3)$ where $f(x) = \frac{1}{x-1}$

$$3 = \frac{1}{x-1},$$
$$3(x-1) = 1,$$
$$3x = 4,$$
$$x = \frac{4}{3}$$

So $f^{-1}(3) = \frac{4}{3}$.

(j) $\sin(\cos^{-1}(\frac{1}{2}))$

$$\sin\theta = \sin\left(\cos^{-1}\left(\frac{1}{2}\right)\right) = \frac{\sqrt{3}}{2}$$

(2) Find the regions where $f(x) = x^2 + 2x - 15$ is positive.

$$x^2 + 2x - 15 > 0,$$
$$(x+5)(x-3) > 0,$$

	$x < -5$	$-5 < x < 4$	$3 < x$
$x+5$	$-$	$+$	$+$
$x-3$	$-$	$-$	$+$
$(x+5)(x-3)$	$+$	$-$	$+$

so, $x \in (-\infty, -5) \cup (3, \infty)$.

(3) Solve the equation $x^3 = x$.

$$x^3 - x = 0$$
$$x(x^2 - 1) = 0$$
$$x = 0, \pm 1$$

(4) Draw the graph of $f(x) = -(x+1)^2 - 1$.
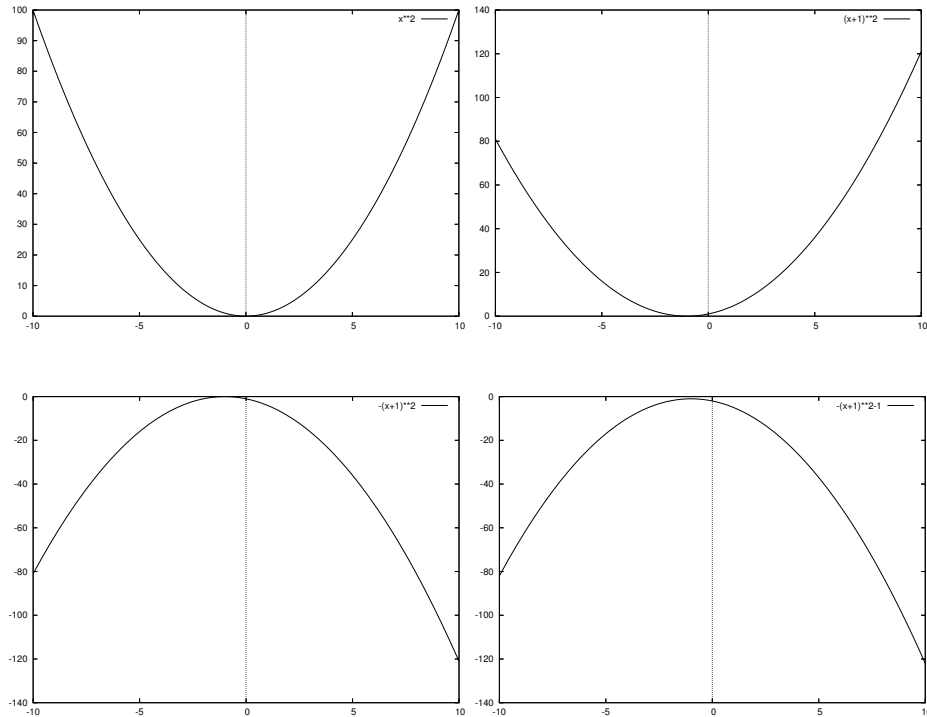
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(5) Solve the following equations and inequalities:

(a) $e^{2x} - e^{-x-1} = 0$

$$e^{2x} = e^{-x-1},$$
$$2x = -x - 1,$$
$$x = -\frac{1}{3}.$$

(b) $\log_5 x^2 + \log_5 4 = 2$

$$\log_5(4x^2) = 2,$$
$$4x^2 = 5^2,$$
$$x^2 = \frac{25}{4},$$
$$x = \pm\frac{5}{2}.$$

(c) $e^{|x|} > 2$

$$|x| > \ln 2,$$
$$x > \ln 2, \text{ or } x < -\ln 2.$$

Over→

(d) $\ln|x^3 - 1| = 4$

$$|x^3 - 1| = e^4,$$
$$x^3 - 1 = e^4 \text{ or } x^3 - 1 = -e^4,$$
$$x = \sqrt[3]{e^4 + 1} \text{ or } x = \sqrt[3]{-e^4 + 1}.$$

(6) Find the domains of the following functions:

(a) $f(x) = \frac{x}{x-1}$

$$x \in (-\infty, 1) \cup (1, \infty).$$

(b) $f(x) = \frac{1}{\sqrt{x}} + \frac{1}{x+1}$

$$x \in (0, \infty)$$

(c) $f(x) = \log_7(x^2 - 2x)$

$$x^2 - 2x > 0,$$
$$x(x-2) > 0.$$

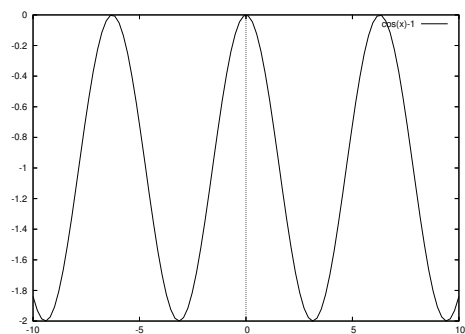|	$x < 0$	$0 < x < 2$	$2 < x$
x	$-$	$+$	$+$
$x - 2$	$-$	$-$	$+$
$x(x-2)$	$+$	$-$	$+$

So $x \in (-\infty, 0) \cup (2, \infty)$.

(d) $f(x) = e^{x^{-1}}$

$$x \in (-\infty, 0) \cup (0, \infty)$$

Over$\rightarrow$

(7) Draw the graph of $f(x) = -1 + \cos x$